

## **REMARKS**

Applicants acknowledge receipt of the Office Action dated February 6, 2003. In that action the Examiner rejected claims 1-19 and 30-37 as allegedly invalid under 35 U.S.C. 112, first paragraph. Applicants believe the pending claims do not suffer from a deficiency under 35 U.S.C. 112, first paragraph, and respectfully request reconsideration.

### **I. RESTRICTION REQUIREMENT**

With this response, Applicants confirm the verbal election to prosecute claims from Group I (claims 1-19 and 30-37). Applicants respectfully traverse this restriction requirement.

The Manual of Patent Examining Procedure (MPEP) states:

If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions.

MPEP, Section 803. Applicants respectfully submit that there will be no additional burden on the Examiner to examine the entire application. For example, claim 1 (in Group I) requires:

transmitting acoustic energy into the earth formation...;  
receiving composite waveforms comprising components of both the fast and slow polarization shear waves;  
decomposing the composite waveforms into decomposed waveforms;  
estimating source waveforms from the decomposed waveforms to create estimated source waveforms; and  
comparing the estimated source waveforms to determine characteristics of the anisotropic earth formation.

Claim 1. Claim 20 (Group II) requires:

transmitting acoustic signals... ;  
receiving the acoustic signals as composite signals;  
decomposing the composite signals into a plurality of decomposed signals;  
estimating a source signal for each of the plurality of decomposed signals... ; and  
determining the acoustic velocity of the fast and slow polarized shear waves by comparison of the plurality of estimated source signals.

Claim 20. Claim 38 (of Group III) requires:

transmitting acoustic energy into the earth formations... ;

receiving composite waveforms comprising components of both the fast and slow polarization shear waves;  
decomposing the composite waveforms into decomposed waveforms;  
estimating source waveforms from the decomposed waveforms to create estimated source waveforms; and  
comparing the estimated source waveforms to determine the orientation of fast and slow polarized shear waves.

Claim 38. Thus, the Examiner, in examining the Group I claims, will need to search for art related to receiving composite waveforms, decomposing the composite waveforms, and estimating source waveforms from the decomposed waveforms. This search, by its very nature, overlaps with the search that may be required for the non-elected groups II and III.

Based on the foregoing, Applicants respectfully submit that while there may be separate inventions between the elected and non-elected groups, there will be no serious additional burden on the Examiner to examine the case in its entirety.

## **II. 35 U.S.C. SECTION 112, FIRST PARAGRAPH, REJECTIONS**

In the Office Action dated February 6, 2003, the Examiner rejected all the elected claims (claims 1-19 and 30-37) as allegedly being directed to subject matter that is not enabled.

“Any analysis of whether a particular claim is supported by the disclosure in an application requires a determination of whether that disclosure, when filed, contains sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention.” MPEP 2164.01. In determining whether an application is enabled, the MPEP, quoting United States Supreme Court precedent, makes the following statement:

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation.

*Id.* (quoting *United States v. Telectronics, Inc.*, 857 F.2d 778, 785 (Fed. Cir. 1988)). It is noted, however, that “the specification need not disclose what is well-known to those skilled in the art

**and preferably omits that which is well-known to those skilled and already available to the public.”** MPEP 2164.05(a)(emphasis added); MPEP 2164.01.

The factors that should be considered when determining whether experimentation may be undue may comprise:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill in the art;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and
- (H) The quantity of experimentation needed to make or use the invention based on the contents of the disclosure.

MPEP 2164.01(a). Here, the level of one of ordinary skill in the art, in combination with the fact that one need not describe what is well known in the art, undermines the Examiner’s Section 112, first paragraph, rejection.

In order to assist the Examiner in making a determination as to the enablement of the current specification, Applicants submit concurrently herewith the factual declaration of Dr. Arthur C.H. Cheng. Dr. Cheng holds a doctorate degree in geophysics from the Massachusetts Institute of Technology, and a Bachelor of Science in Engineering Physics from Cornell University. Affidavit of Dr. Cheng, ¶2. As of the filing date of the current specification, December 21, 2001, Dr. Cheng had twenty-three years of experience designing, building and testing downhole acoustic logging tools. *Id.*

One of the factors that should be considered when addressing the undue experimentation question is the level of skill of one of ordinary skill in the art. MPEP 2164.01(a). The level of one of ordinary skill in the acoustic logging industry may be relatively high. In fact, one of ordinary skill in these arts may hold a doctorate degree in a specifically related field and have at least five years of experience. Affidavit of Dr. Cheng, ¶3. The disclosure necessary to enable

one holding a Ph.D. in the related field is significantly less than a person with little or no engineering and/or mathematical background. The level of one of ordinary skill in the pertinent art weighs heavily against the Examiner's assertion that the specification is not enabled.

In fulfilling his burden to provide a reasonable explanation as to why the teachings may not be adequate to enable the disclosure (MPEP 2164.04), the Examiner seems to question whether one of ordinary skill in the art could formulate an assumed transfer function. Office Action dated February 6, 2003, page 3 (“[I]t is not clear how the estimate source waveforms is defined...”). Applicants respectfully submit that the disclosure, in combination with the knowledge of one of ordinary skill in the art, is sufficient to teach one of ordinary skill in the art to make and use the invention without undue experimentation.

In particular, Dr. Cheng believes that at least one assumed transfer function is defined. Paragraph [0024] states, “The transfer function may be relatively simple, taking into account only the finite speed at which the acoustic signals propagate ...”. Dr. Cheng reads this to mean the assumed transfer function is a simple “travel time equals distance divided by speed” calculation. Affidavit of Dr. Cheng, ¶6. Clearly Dr. Cheng, one of at least ordinary skill in the art, could devise an assumed transfer function from the specification alone.

The specification goes on to state, again at paragraph [0024], “The transfer function ... may be very complex, to include estimations of attenuation of the transmitted signal in the formation, paths of travel of the acoustic signals, the many different propagation modes within the formation ...”. Dr. Cheng understands this description to mean that embodiments of the invention may also be used where the transfer function is more complex, to include borehole geometry and the like. Affidavit of Dr. Cheng, ¶7. In fact, Dr. Cheng goes further to state that these transfer functions are well known in the art. “There have been many publications in literature describing how to calculate such a transfer function, the earliest going back to a 1952

paper ...” Affidavit of Dr. Cheng, ¶7. These transfer functions may also be taught to students out of standard textbooks. *See* Affidavit of Cheng, ¶7 (Textbook titled “Acoustic Waves in Boreholes”).

Thus, the Examiner’s concern that one of ordinary skill in the art may not be able to determine an estimated transfer function is simply misplaced. Transfer functions of formations appear to be well known in the art, even being a standard subject studied by students in the field.

Finally, Dr. Cheng states that he could design and make an operable acoustic logging system as described in the specification at issue, with little experimentation, based on his knowledge of the state of the art as of the filing of the application. Affidavit of Dr. Cheng, ¶15. The Examiner is reminded that, “a declaration or affidavit is, itself, evidence that must be considered.” MPEP 2164.05. “The evidence provided by the applicant need not be conclusive but merely convincing to one skilled in the art.” *Id.* (emphasis original).

Based on the foregoing, Applicants respectfully submit that the specification does not suffer from deficiencies under 35 U.S.C. § 112, first paragraph.

### **III. CONCLUSION**

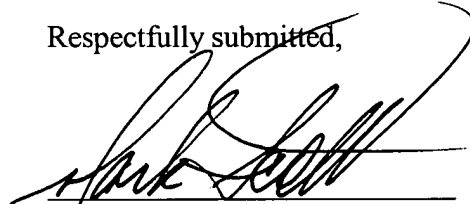
Applicants respectfully request reconsideration and allowance of the pending claims. If the Examiner feels that a telephone conference would expedite the resolution of this case, he is respectfully requested to contact the undersigned.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood

that there may be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Mark E. Scott', is written over a horizontal line.

Mark E. Scott  
PTO Reg. No. 43,100  
CONLEY ROSE, P.C.  
P.O. Box 3267  
Houston, TX 77253-3267  
(713) 238-8000 (Phone)  
(713) 238-8008 (Fax)